

## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A machine-implemented method for management of network addresses comprising the steps of:  
determining an address utilization state of a network, wherein the address utilization state is based on at least one of:  
a percentage[[,]] of a certain address space allocated to a network service provider[[,]]  
that is in use by at least one of a physical interface and a sub-interface of  
network access devices that couple ~~used by~~ subscribers of the  
network service provider to the network, over a total address space available  
to the network service provider;  
a percentage of address space that is in use at a physical interface over the total  
address space allocated by the owner; and  
a percentage of address space in use at a physical interface over the amount of address  
space allocated to that interface and to a network service provider; and  
wherein the determining comprises at least one of:  
collecting the address utilization data from at least one Dynamic Host  
Configuration Protocol (DHCP) server of the network; and  
polling a broadband terminal directly to obtain the address utilization data  
therefrom; and  
performing a specified action on addresses from the certain address space in  
response to the determining the address utilization state wherein at least  
one attribute of the certain address space is changeable with the specified  
action.
2. (original) The method of claim 1 further comprising the steps of:  
comparing the address utilization state with condition information;  
upon the address utilization state meeting the condition, completing the step of performing a  
specified action wherein the specified action is associated with the condition; and  
upon the address utilization state not meeting the condition, completing the step of  
performing a specified action wherein the specified action is a null action.

3. (previously presented) The method of claim 1 wherein the action is allocating a group of specific addresses to a particular network, for assigning the addresses to devices on the particular network.

4. (original) The method of claim 1 wherein the action is reconfiguring addresses on a particular network including more than one address block, resulting in decreasing the number of address blocks associated with the particular network.

5. (original) The method of claim 4 wherein the addresses are reconfigured based on an existing address block.

6. (original) The method of claim 1 wherein the action is reclaiming specific addresses from a particular network, resulting in making the addresses unassignable to devices on the particular network.

7. (original) The method of claim 1 wherein the action is notifying a network access manager that an address utilization condition is met and awaiting a response from the network access manager as to further action to perform.

8. (original) The method of claim 1 wherein the step of determining the state of address utilization comprises querying a Dynamic Host Configuration Protocol (DHCP) server.

9. (Currently Amended) A machine-implemented method for automated management of network addresses comprising the steps of:

receiving condition information that describes ~~describing~~ a network address utilization state  
for triggering an action;

receiving action information describing an action associated with the condition;

determining an address utilization state of a network, wherein the address utilization state is  
based on at least one of:

a percentage[[,]] of a certain address space allocated to a network service provider[[,]] that is in use by at least one of a physical interface and a sub-interface of network access devices that couple ~~used~~ by subscribers of the network service provider to the network, over a total address space available to the network service provider;  
a percentage of address space that is in use at a physical interface over the total address space allocated by the owner; and  
a percentage of address space in use at a physical interface over the amount of address space allocated to that interface and to a network service provider; and  
wherein the determining comprises at least one of:  
collecting the address utilization data from at least one Dynamic Host Configuration Protocol (DHCP) server of the network; and  
polling a broadband terminal directly to obtain the address utilization data therefrom; and  
performing the specified action on addresses from the certain address space in response to the address utilization state meeting the condition wherein at least one attribute of the certain address space is changeable with the specified action.

10. (previously presented) The method of claim 9 wherein the description of the condition and the specification of the action are received from a broadband network access provider that is responsible for distributing network addresses to devices used by subscribers of a network service provider that provides network access through the access network of the network access provider.

11. (original) The method of claim 9 wherein the step of determining the address utilization state comprises querying a Dynamic Host Configuration Protocol (DHCP) server.

12. (original) The method of claim 9 wherein the step of performing the specified action comprises the steps of:  
defining to an address assignor one or more ranges of network addresses wherein the ranges include addresses that are assignable to devices on a network; and

configuring at least one routing means on the network to support routing transmissions to at least one of the network addresses.

13. (original) The method of claim 12 wherein the step of configuring at least one routing means comprises the steps of:

creating one or more sub-interfaces on a physical interface of the routing means, wherein each sub-interface is associated with a particular network service provider; and assigning one or more sub-networks to one or more of the sub-interfaces.

14. (original) The method of claim 12 wherein the step of performing the specified action further comprises the steps of:

specifying to the address assignor one or more sub-networks to which any of the one or more defined network address ranges are assignable;  
reserving a network address for a particular router means associated with a particular sub-network from the one or more sub-networks, wherein the reserved network address is from a defined address range assigned to the particular sub-network; and  
specifying to the address assignor a particular default routing means for a particular device on the network that is assigned a network address from any of the one or more defined address ranges.

15. (original) The method of claim 12 wherein the step of defining to an address assignor one or more ranges of network addresses comprises proportionally associating a range of network addresses to routing means based on a previous distribution of addresses associated with the routing means.

16. (original) The method of claim 9 wherein the step of performing the specified action comprises the steps of:

defining to an address assignor one or more ranges of network addresses wherein the ranges include addresses that are assignable by the address assignor to devices on a network and wherein the ranges of network addresses are newly defined to the address assignor;

configuring at least one routing means on the network to support routing transmissions to at least one of the network addresses;  
specifying to the address assignor one or more sub-networks to which any of the one or more defined address ranges are assignable;  
reserving a network address for a particular router means associated with a particular sub-network from the one or more sub-networks, wherein the reserved network address is from a defined address range assigned to the particular sub-network;  
specifying to the address assignor a particular default routing means for a particular device on the network that is assigned a network address from any of the one or more defined address ranges; and  
directing the address assignor to discontinue renewing and distributing network addresses from one or more old ranges of network addresses other than those newly defined to the address assignor.

17. (original) The method of claim 16, further comprising, upon passing of one address lease cycle associated with the address assignor and each network device administered by the address assignor, the steps of:

removing from the address assignor the capability to assign to network devices the addresses from the one or more old ranges, and  
removing from routing means the capability to support routing transmissions to the network addresses from the one or more old ranges.

18. (original) The method of claim 16 wherein the step of configuring routing means comprises the steps of:

creating one or more sub-interfaces on a physical interface of the routing means, wherein each sub-interface is associated with a particular network service provider; and  
assigning one or more sub-networks to one or more of the sub-interfaces.

19. (original) The method of claim 9 wherein the step of performing the specified action comprises the steps of:

directing an address assignor to discontinue renewing and distributing network addresses from one or more ranges of network addresses; and  
upon passing of one address lease cycle associated with the address assignor and each network device administered by the address assignor, removing from the address assignor the capability to assign to network devices the addresses from the one or more ranges, and removing from one or more routing means the capability to support routing transmissions to the network addresses from the one or more ranges.

20. (Currently Amended) A machine-implemented method for automated management of network addresses comprising the steps of:

receiving condition information that describes ~~describing~~ a network address utilization state for triggering an action;

receiving action information describing an action associated with the condition;

determining an address utilization state of a network, wherein the address utilization state is based on at least one of:

a percentage[[,]] of a certain address space allocated to a network service provider[[,]] that is in use by at least one of a physical interface and a sub-interface of network access devices that couple ~~used by~~ subscribers of the network service provider to the network, over a total address space available to the network service provider;

a percentage of address space that is in use at a physical interface over the total address space allocated by the owner; and

a percentage of address space in use at a physical interface over the amount of address space allocated to that interface and to a network service provider; and wherein the determining comprises at least one of:

collecting the address utilization data from at least one Dynamic Host

Configuration Protocol (DHCP) server of the network; and

polling a broadband terminal directly to obtain the address utilization data;

and

performing a specified action on addresses from the certain address space in response to the determining the address utilization state wherein at least one attribute of the certain

address space is changeable with the specified action;  
wherein the steps are performed at one or more facilities from a hierarchical group of facilities described, in increasing levels, as a cable head-end facility, a cable regional data center facility, and a cable national data center facility; and  
wherein the steps are performed at one of the one or more facilities to manage network addresses of facilities on the same hierarchical level.

21. (original) The method of claim 20 wherein the steps are performed at one of the one or more facilities to manage network addresses of facilities on a lower hierarchical level.

22. (Currently Amended) A machine-implemented method for automated management of network addresses comprising the steps of:

receiving condition information describing a network address utilization state for triggering an action;

receiving action information describing an action associated with the condition;

determining an address utilization state of a network, wherein the address utilization state is based on at least one of:

a percentage[[,]] of a certain address space allocated to a network service provider[[,]] that is in use by at least one of a physical interface and a sub-interface of network access devices that couple used by subscribers of the network service provider to the network, over a total address space available to the network service provider;

a percentage of address space that is in use at a physical interface over the total address space allocated by the owner; and

a percentage of address space in use at a physical interface over the amount of address space allocated to that interface and to a network service provider; and

wherein the determining comprises at least one of:

collecting the address utilization data from at least one Dynamic Host

Configuration Protocol (DHCP) server of the network; and

polling a broadband terminal directly to obtain the address utilization data[[, and]] wherein the available network addresses are substantially utilized and

responsively performing a specified action on addresses from the certain address space in response to the determining the address utilization state wherein at least one attribute of the certain address space is changeable with the specified action, wherein the responsively performing comprises the steps of:

defining to an address assignor one or more ranges of network addresses wherein the ranges include addresses that are assignable to devices on the network;  
configuring at least one routing means on the network to support routing transmissions to at least one of the network addresses;  
specifying to the address assignor one or more sub-networks to which any of the one or more defined network address ranges are assignable;  
reserving a network address for a particular router means associated with a particular sub-network from the one or more sub-networks, wherein the reserved network address is from a defined address range assigned to the particular sub-network; and  
specifying to the address assignor a particular default routing means for a particular device on the network that is assigned a network address from any of the one or more defined address ranges.

23. (Currently Amended) A computer-readable medium carrying one or more sequences of instructions for managing network addresses, wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform steps of:

determining an address utilization state of a network, wherein the address utilization state is based on at least one of:

a percentage[[,]] of a certain address space allocated to a network service provider[[,]]  
that is in use by at least one of a physical interface and a sub-interface of network access devices that couple used by subscribers of the network service provider to the network, over a total address space available to the network service provider;



a percentage of address space that is in use at a physical interface over the total address space allocated by the owner; and  
a percentage of address space in use at a physical interface over the amount of address space allocated to that interface and to a network service provider; and  
wherein the determining comprises at least one of:  
collecting the address utilization data from at least one Dynamic Host Configuration Protocol (DHCP) server of the network; and  
polling a broadband terminal directly to obtain the address utilization data therefrom; and  
performing a specified action on addresses from the certain address space in response to the determining the address utilization state wherein at least one attribute of the certain address space is changeable with the specified action.

24. (original) The computer-readable medium of claim 23 wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the specified action by causing the one or more processors to perform a step of: allocating specific addresses to a particular network, the addresses being assignable to devices on the particular network.

25. (original) The computer-readable medium of claim 23 wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the specified action by causing the one or more processors to perform a step of: reconfiguring addresses on a particular network including more than one address block, resulting in decreasing the number of address blocks associated with the particular network.

26. (original) The computer-readable medium of claim 23 wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the specified action by causing the one or more processors to perform a step of:

reclaiming specific addresses from a particular network, resulting in making the addresses unassignable to devices on the particular network.

27. (original) The computer-readable medium of claim 23 wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the specified action by causing the one or more processors to perform a step of: notifying a network access manager that an address utilization condition is met and awaiting a response from the network access manager as to further action to perform.

28. (original) The computer-readable medium of claim 23 wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors to perform the step of determining a state of address utilization by causing the one or more processors to perform a step of:  
querying a Dynamic Host Configuration Protocol (DHCP) server application.

29. (Currently Amended) A computer system comprising:  
a network interface; and  
one or more processors connected to the network interface, the one or more processors configured for:  
receiving a description of a condition describing a network address utilization state for triggering an action;  
determining an address utilization state of a network, wherein the address utilization state is based on at least one of:  
a percentage[[,]] of a certain address space allocated to a network service provider[[,]]  
that is in use by at least one of a physical interface and a sub-interface of  
network access devices that couple used by subscribers of the  
network service provider to the network, over a total address space available  
to the network service provider;  
a percentage of address space that is in use at a physical interface over the total  
address space allocated by the owner; and

a percentage of address space in use at a physical interface over the amount of address space allocated to that interface and to a network service provider; and  
wherein the determining comprises at least one of:  
collecting the address utilization data from at least one Dynamic Host Configuration Protocol (DHCP) server of the network; and  
polling a broadband terminal directly to obtain the address utilization data therefrom; and  
performing a specified action on addresses from the certain address space in response to the determining the address utilization state wherein at least one attribute of the certain address space is changeable with the specified action.

30. (Currently Amended) An apparatus for managing network addresses, the apparatus comprising:  
means for receiving a description of a condition describing a network address utilization state for triggering an action;  
means for determining an address utilization state of a network, wherein the address utilization state is based on at least one of:  
a percentage[[,]] of a certain address space allocated to a network service provider[[,]] that is in use by at least one of a physical interface and a sub-interface of network access devices that couple used by subscribers of the network service provider to the network, over a total address space available to the network service provider;  
a percentage of address space that is in use at a physical interface over the total address space allocated by the owner; and  
a percentage of address space in use at a physical interface over the amount of address space allocated to that interface and to a network service provider; and  
wherein the determining means comprise at least one of:  
means for collecting the address utilization data from at least one Dynamic Host Configuration Protocol (DHCP) server of the network; and

means for polling a broadband terminal directly to obtain the address utilization data therefrom; and  
means for performing a specified action on addresses from the certain address space in response to the determining the address utilization state wherein at least one attribute of the certain address space is changeable with the specified action.

31. (Currently Amended) A computer system comprising:  
a network interface; and  
one or more processors connected to the network interface, the one or more processors configured for:  
receiving condition information describing a network address utilization state for triggering an action;  
receiving action information describing an action associated with the condition;  
determining an address utilization state of a network, wherein the address utilization state is based on at least one of:  
a percentage[[,]] of a certain address space allocated to a network service provider[[,]]  
that is in use by at least one of a physical interface and a sub-interface of network access devices that couple used by subscribers of the network service provider to the network, over a total address space available to the network service provider;  
a percentage of address space that is in use at a physical interface over the total address space allocated by the owner; and  
a percentage of address space in use at a physical interface over the amount of address space allocated to that interface and to a network service provider; and  
wherein the determining comprises at least one of:  
collecting the address utilization data from at least one Dynamic Host Configuration Protocol (DHCP) server of the network; and  
polling a broadband terminal directly to obtain the address utilization data therefrom;[[,]] and

wherein the available network addresses are substantially utilized and responsively performing a specified action on addresses from the certain address space in response to the determining the address utilization state wherein at least one attribute of the certain address space is changeable with the specified action and comprises the steps of:

defining to an address assignor one or more ranges of network addresses wherein the ranges include addresses that are assignable to devices on the network;

configuring at least one routing means on the network to support routing transmissions to at least one of the network addresses;

specifying to the address assignor one or more sub-networks to which any of the one or more defined network address ranges are assignable;

reserving a network address for a particular router means associated with a particular sub-network from the one or more sub-networks, wherein the reserved network address is from a defined address range assigned to the particular sub-network; and

specifying to the address assignor a particular default routing means for a particular device on the network that is assigned a network address from any of the one or more defined address ranges.

32. (Currently Amended) An apparatus for automated management of network addresses, the apparatus comprising:

means for receiving condition information describing a network address utilization state for triggering an action;

means for receiving action information describing an action associated with the condition;

means for determining an address utilization state of a network, wherein the address utilization state is based at least one of:

a percentage[[,]] of a certain address space allocated to a network service provider[[,]]  
that is in use by at least one of a physical interface and a sub-interface of  
network access devices that couple used by subscribers of the  
network service provider to the network, over a total address space available  
to the network service provider;

a percentage of address space that is in use at a physical interface over the total address space allocated by the owner; and  
a percentage of address space in use at a physical interface over the amount of address space allocated to that interface and to a network service provider;  
wherein the determining means comprise at least one of:  
means for collecting the address utilization data from at least one Dynamic Host Configuration Protocol (DHCP) server of the network; and  
means for polling a broadband terminal directly to obtain the address utilization data therefrom; and  
wherein, responsive to a function of the determining means, an action performing means functions to perform a specified action on addresses from the certain address space wherein at least one attribute of the certain address space is changeable with the specified action and wherein the action performing means comprise:  
means for defining to an address assignor one or more ranges of network addresses wherein the ranges include addresses that are assignable to devices on the network;  
means for configuring at least one routing means on the network to support routing transmissions to at least one of the network addresses;  
means for specifying to the address assignor one or more sub-networks to which any of the one or more defined network address ranges are assignable;  
means for reserving a network address for a particular router means associated with a particular sub-network from the one or more sub-networks, wherein the reserved network address is from a defined address range assigned to the particular sub-network; and  
means for specifying to the address assignor a particular default routing means for a particular device on the network that is assigned a network address from any of the one or more defined address ranges.

33. (New) The apparatus as recited in Claim 32, further comprising:  
means for comparing the address utilization state with condition information;

means for, upon the address utilization state meeting the condition, completing the step of performing a specified action wherein the specified action is associated with the condition; and

means for, upon the address utilization state not meeting the condition, completing the step of performing a specified action wherein the specified action is a null action.

34. (New) The apparatus as recited in Claim 32 wherein the action comprises allocating a group of specific addresses to a particular network, for assigning the addresses to devices on the particular network.

35. (New) The apparatus as recited in Claim 32 wherein the action comprises reconfiguring addresses on a particular network including more than one address block, resulting in decreasing the number of address blocks associated with the particular network.

36. (New) The apparatus as recited in Claim 35 wherein the addresses are reconfigured based on an existing address block.

37. (New) The apparatus as recited in Claim 32 wherein the action comprises reclaiming specific addresses from a particular network, resulting in making the addresses unassignable to devices on the particular network.

38. (New) The apparatus as recited in Claim 32 wherein the action comprises notifying a network access manager that an address utilization condition is met and awaiting a response from the network access manager as to further action to perform.

39. (New) The apparatus as recited in Claim 32 wherein the determining means comprise means for querying a Dynamic Host Configuration Protocol (DHCP) server.

40. (New) The computer system as recited in Claim 29 wherein the one or more processors is further configured for:  
comparing the address utilization state with condition information;

upon the address utilization state meeting the condition, completing the step of performing a specified action wherein the specified action is associated with the condition; and  
upon the address utilization state not meeting the condition, completing the step of performing a specified action wherein the specified action is a null action.

41. (New) The computer system as recited in Claim 29 wherein the action comprises allocating a group of specific addresses to a particular network, for assigning the addresses to devices on the particular network.

42. (New) The computer system as recited in Claim 29 wherein the action comprises reconfiguring addresses on a particular network including more than one address block, resulting in decreasing the number of address blocks associated with the particular network.

43. (New) The computer system as recited in Claim 42 wherein the addresses are reconfigured based on an existing address block.

44. (New) The computer system as recited in Claim 29 wherein the action comprises reclaiming specific addresses from a particular network, resulting in making the addresses unassignable to devices on the particular network.

45. (New) The computer system as recited in Claim 29 wherein the action comprises notifying a network access manager that an address utilization condition is met and awaiting a response from the network access manager as to further action to perform.

46. (New) The computer system as recited in Claim 29 wherein determining the state of address utilization comprises querying a Dynamic Host Configuration Protocol (DHCP) server.